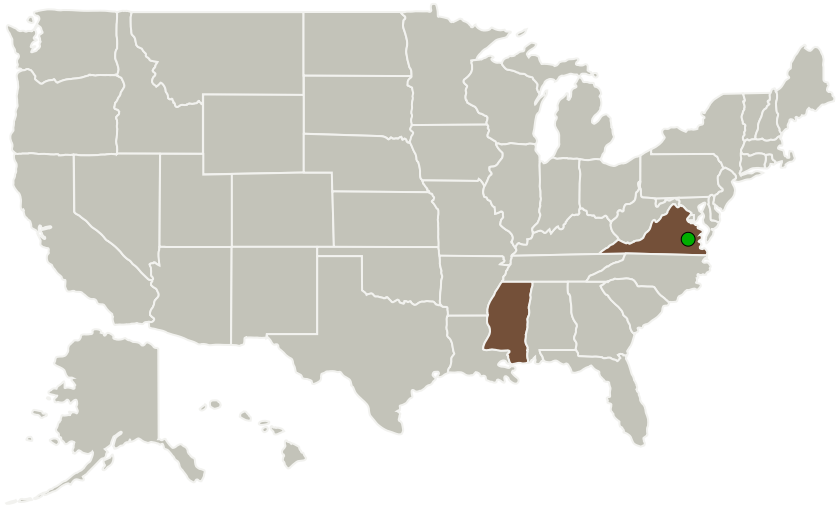
Discrete Geometry Toolkit for Shape Optimization, Phase II

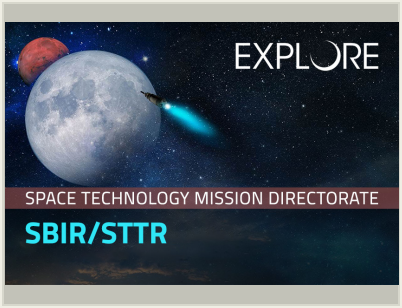
Completed Technology Project (2011 - 2013)

Project Introduction

Simulation-based design optimization has been steadily maturing over the past two decades, but not without its own unique and persistent challenges. The proposed project will develop a novel solution to one of the long-standing bottlenecks in simulation-based design optimization. Particularly, we will develop a flexible geometry toolkit for shape parameterization and modification as required for design optimization. With our discrete geometry toolkit, shape modifications will be achieved via an elegant and intuitive "plug-and-play" approach, providing engineers with a wide variety of options for shape parameterization, shape deformation, and geometric constraint imposition. Our geometry toolkit will be composed of independent modules and will be easily integrated into existing or future analysis and design environments. Our approach will offer a modular and intuitive means to interactively synthesize appropriate modifications to discrete geometry shapes in a design optimization setting including the specification of geometric constraints and interdisciplinary data transfer.

Primary U.S. Work Locations and Key Partners





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Organizations Performing Work	Role	Type	Location
Optimal, LLC	Lead Organization	Industry	Starkville, Mississippi
Langley Research Center(LaRC)	Supporting Organization	NASA Center	Hampton, Virginia

Primary U.S. Work Locations	
Mississippi	Virginia

Project Transitions

June 2011: Project Start

May 2013: Closed out

Closeout Documentation:

- Final Summary Chart*(https://techport.nasa.gov/file/138809)*

Organizational Responsibility

Responsible Mission Directorate:

Space Technology Mission Directorate (STMD)

Lead Organization:

Optimal, LLC

Responsible Program:

Small Business Innovation Research/Small Business Tech Transfer

Project Management

Program Director:

Jason L Kessler

Program Manager:

Carlos Torrez

Principal Investigator:

Greg W Burgreen

Co-Investigator:

Greg Burgreen

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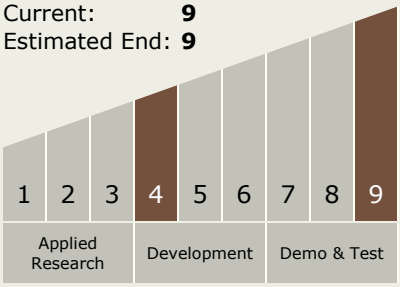
Technology Maturity (TRL)

Start: **4**
Current: **9**
Estimated End: **9**



Technology Areas

Primary:

- TX12 Materials, Structures, Mechanical Systems, and Manufacturing
  - TX12.1 Materials
    - TX12.1.8 Smart Materials

Target Destinations

The Sun, Earth, The Moon, Mars, Others Inside the Solar System, Outside the Solar System